

### Remarks

This Preliminary Amendment cancels without prejudice original claims 1 to 6 in the underlying PCT Application No. PCT/DE03/04133. This Preliminary Amendment adds new claims 7-12. The new claims, *inter alia*, conform the claims to United States Patent and Trademark Office rules and do not add new matter to the application

In accordance with 37 C.F.R. § 1.125(b), the Substitute Specification (including the Abstract, but without the claims) contains no new matter. The amendments reflected in the Substitute Specification (including Abstract) are to conform the Specification and Abstract to U.S. Patent and Trademark Office rules or to correct informalities. As required by 37 C.F.R. § 1.121(b)(3)(ii) and § 1.125(c), a Marked Up Version Of The Substitute Specification comparing the Specification of record and the Substitute Specification also accompanies this Preliminary Amendment. Approval and entry of the Substitute Specification (including Abstract) are respectfully requested.

The underlying PCT Application No. PCT/DE03/04133 includes an International Search Report, dated May 10, 2004, a copy of which is included. The Search Report includes a list of documents that were considered by the Examiner in the underlying PCT application.

Applicants assert that the subject matter of the present application is new, non-obvious, and useful. Prompt consideration and allowance of the application are respectfully requested.

Respectfully Submitted,

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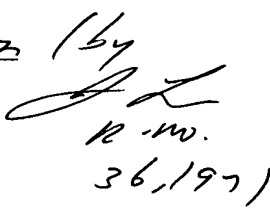
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## DEVICE FOR A LINE TERMINATION OF TWO-WIRE LINES

~~Related Art~~ Field of the Invention

The present invention relates to a device for a line termination of two-wire lines having a first and second terminating resistor between the two wires, the first and the second terminating resistor being connected in series.

Background Information

Such a device for a line termination of two-wire lines is known from described in the German patent DE 195 25 350 A1. It is ~~proposed~~ described there that at least one first and one second terminating resistor ~~beare~~ are provided between the two wires of the two-wire line and that the two resistors be connected in series. Originating with the connecting line between the two resistors is a line that is connected to a fixed voltage potential, especially ground. Until now, the terminating resistor has always been permanently predefined, especially in a CAN bus system, i.e., either implemented or not implemented in the control unit. As a consequence, there is no flexibility in use.

Therefore, it is ~~thean~~ an object of the present invention to provide a device that allows greater flexibility when used in a line termination of two-wire lines.

~~Summary of the Invention~~ Summary

The ~~mentioned objective is achieved by~~ present invention provides a device for a line termination of two-wire lines having at least one first and one second terminating resistor between the two wires, the first and the second terminating

resistor being connected in series, and at least one switching means arrangement being ~~advantageously~~ provided between the two terminating resistors.

- 5 This increases the flexibility during use since a rapid switch or rapid adaptation is possible in the application when using the terminating resistor configured in this manner.

10 In an advantageous manner, ~~this~~ the device according to the present invention ~~is~~ may be used in connection with a CAN bus system and assumes the receive and/or transmit function therein, so that the two-wire line is part of a CAN bus system, i.e., the lines CAN high and CAN low.

- 15 In addition, a switching logic is ~~expediently~~ provided, which triggers the at least one switching means as a function of an input signal.

20 Furthermore, in a ~~special~~ an example embodiment, it is ~~advantageously provided~~ that this input signal is generated by an arithmetic function block, ~~especially~~ e.g., the microcontroller itself.

25 The use of a configurable terminating resistor, in particular a CAN terminating resistor, makes it possible to adapt the termination resistor to the individual application, either by controlling the switching logic via software (via digital output from  $\mu c$ ) or via hardware, i.e., by way of a hardware bridge in the cable harness plug. This minimizes the  
30 multitude of control units, especially on the side of the customer and supplier, for instance to a single control unit for stand-alone, master and slave, for example, instead of one for each application. The result is reduced expenditure for

logistics and stock-keeping and, in particular, also lower costs for customers and suppliers.

In an advantageous manner, a balancing member is connected between the terminating resistors, which, in a ~~useful~~ specific example embodiment, is able to be connected thereto by one switching means for each terminating resistor.

In this way, a control unit, ~~especiall~~y~~e.g.~~, for the control of operating sequences in a vehicle, is able to be adapted to various applications by software configuration, in particular.

~~Brief Description of the Drawing~~ Brief Description of the Drawing

~~Hereinafter, the present invention is explained in greater detail with the aid of the drawing shown in the single figure. It~~ Figure 1 shows a block diagram of a device according to the present invention.

~~Description of the Exemplary Embodiments~~ Detailed Description

The single figure - Figure 1 - shows a CAN high and a CAN low line, CAN-H and CAN-L, respectively, which are connected to a component 100 via coupling elements 111 and 112, respectively, ~~in particular as a function of~~ which component 100 functions as a CAN transceiver. As just mentioned, that is, component 100 assumes the receive and/or transmit functionality, i.e., the transceiver function of a CAN component in this respect. The CAN-High and CAN-Low lines are guided to a driver module, in particular a CAN driver module 103. Furthermore, two terminating resistors 107 and 108 are shown, which are connected in series and, with the aid of switching means 105 and 106, are able to be connected to one another and also to a

balancing unit, i.e., a balancing element 109. Switching means 105 and 106 are addressed by a control logic 104, which action is symbolically denoted by the dashed arrows. The control logic 104 itself receives an input signal via line 5 114, and an additional coupling element 110, for instance from an output 113 of the arithmetic function block or microcontroller 101, ~~via an output thereof, for instance output 113.~~ Furthermore, the microcontroller 101 is connected to the driver module 103 for the communication via a 10 communication connection 102 in a unidirectional and/or bidirectional manner.

On the basis of the input signal at switching control logic 104, it is possible to select whether the terminating resistor 15 is active or separated from the bus. On the one hand, the input signal may be generated or picked off digitally, i.e., via microcontroller output 113, or via a bridge in the cable-harness plug. The separation from the bus ~~is~~ may be realized by two electrical switches, i.e., switching means 105 and 106. 20 This allows the configuration of the terminating resistor to be modified at any time via ~~a~~ the microcontroller output; in the case of a bridge in the cable-harness plug, this is possible only after its reconfiguration.

25 Due to the installation of the configurable CAN terminating resistor, the terminating resistor is able to be adapted to the particular application either by software-based or hardware-based triggering of the switching logic. In a software-based adaptation, the digital output of 30 microcontroller 101 will be used for this purpose. In a hardware-based adaptation, this ~~must be~~ is implemented by a bridge in the cable-harness tree. In the case of control units for the control of operating sequences, especiallye.g., in a motor vehicle, this minimizes the multitude of control

devices for customers and suppliers. An adaptation of the CAN  
terminating resistor of the control unit to various  
applications ~~is~~may therefore be implemented solely by  
modifying the software configuration, so that a simple and  
5 flexible possibility for a rapid application adaptation is  
provided.

# ABSTRACT

A device for a line termination of two-wire lines having at least one first and second terminating ~~resistor~~ resistors between the two wires is provided, the first and the second  
5 terminating resistors being connected in series, and at least one switching ~~means~~arrangement being provided between the two terminating resistors.